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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,434	11/10/2003	Timothy D. Seeley	24499-533	4602

48425 7590 08/17/2006

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EXAMINER

ROSENBERGER, RICHARD A

ART UNIT PAPER NUMBER

2877

DATE MAILED: 08/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/705,434

Applicant(s)

SEELEY, TIMOTHY D.

Examiner

Richard A. Rosenberger

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

1. Claims 9, 18, 19, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 is an apparatus claim dependent from a method claim, leaving it unclear how the claims properly further limits its parent claim. It appears as the dependency of claim 18 from claim 10 is a typographical error, and claim 18 was intended to be dependent from one of apparatus claims 14-17, although which one is not clear. Below it is treated as if it was intended to be dependent from claim 14.

Further, claims 18 and 33 claim the presence of a beam splitter, but do not place the beam splitter in any relationship, functional or otherwise, with the remainder of the claimed structure, rendering the claim unclear as to what its scope in and is intended to be. Claim 9 adds the purely locational relationship that there is a beam splitter between the VCSELS and the detectors, but gives the beam splitter no functional relationship to the system; as claimed the beam splitter does nothing.

Claim 19, dependent from claim 18, inherits the problems of claim 18 above.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, and 5-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prater et al (US 2002/0092340).

As in claim 1, Prater discusses, for example in paragraph [0140] on page 12, a method for reading an array of detectors (the individual cantilevers in the cantilever array 1710) comprising illuminating each of the detectors using a plurality of electromagnetic beams arranged in an array (the “light from an array of laser diodes 1708” in paragraph [0140]) and sensing the plurality of electromagnetic beams reflected from the detectors (by means of detector 1706). As seen in figure 19 of Prater, for example, the device with the array of detectors (1710) is in a flow cell, in which a fluid can be passed for testing.

The claim calls the device “a microfluidics device”, but there appears to be nothing in the claim to distinguish what is called a “microfluidics device” in the claim from the flow cell of the reference, and there appears to be no definition of the term “microfluidics device” in the disclosure as filed to give the term a sufficiently clear and distinct meaning to distinguish the term in the claim from the flow cell of the reference. Further, to the degree that there may be a difference, it would have been obvious to use the system of reading the detector array of Prater in any system in which such a detector array may be used, including a “microfluidics device”, because this is a known method for measuring a known test apparatus in a known manner that does not depend upon the details of the particular apparatus in which the detector array may find itself.

Similarly for claim 14; the apparatus of Prater discussed in paragraph [0140] comprised an array of illuminators (1708), which illuminate the detectors (which make

up 1710) and a position sensitive device (1706). It is at least clearly obvious to put this arrangement in a housing, housing are so well-known and so commonly used official notice is sufficient.

In claim 14, the phrase “in a microfluidics device” is a non-limiting statement of intended use, the microfluidics device itself is not being claimed. To the degree that it could be argued that the “microfluidics device” may be considered to be claimed, as set forth with respect to claim 1 above, the use with such a device would have been obvious.

As in claim 31, the reference teaches, in paragraph [0145], an illuminator comprising a plurality of VCSELs which generate a array of electromagnetic beams to illuminate an array of microcantilevers (1710) within a flow cell. The reference does not mention that the system has “a circuit with electronics and control”, but it is at least obvious to make the system of the reference actually operable by supplying such necessary additional structure. As set forth above, the use of a housing to enclose the system would have been obvious.

As above, the claim appears to contain no structure to distinguish the claimed “microfluidics device” from the flow cell of the reference, and the disclosure as filed does not appear to contain a specific definition of the term to distinguish the claimed device from that of the reference. Also as above, to the degree that there may be a difference, the use of the known system of the reference for its known purpose, using it in its known manner, with a “microfluidics device” would have been obvious.

As in claims 2 and 15, the reference discloses that the illuminators are VCSELs. As in claims 3 and 16, the detectors of the reference are microcantilevers.

Instant claims 5 calls for the sensing means to be a plurality of position sensitive detectors; claim 26 calls for the at least one photosensitive cell detects the deflection of the beam. The Prater reference, in paragraph [0011] on page 1, in discussing “prior work”, mentions the use of “an array of detectors” (lines 7-8 of paragraph [0011]). Thus as described by the reference, the use of a plurality of detectors is known in the art for the purpose of detecting the light reflected from such cantilevers, and it would have thus been obvious to use such an array of detectors to detect the lights in the system as discussed in paragraph [0145] above because the use of a plurality of detectors is, as taught by the reference, a known manner of detecting the light beams.

As in claim 6, the lasers of the reference are clearly intended to generate electromagnetic beams to illuminate the cantilever detectors. As in claim 7, it is at least clearly obvious to mount the array of VCSELs on a substrate; they must be mounted on something as they will not float unsupported. As in claim 8, the flow cell inherently will be “at a distance” from the light sources; while the reference does not appear to discuss particular dimensions for this distance, those in the art could complete the disclosure by choosing an appropriate distance such as that of claims 17 and 44.

As for claims 10, 34, and 35, the use of any wavelength of light that would have been obvious as the operation of the system is not dependent upon the exact wavelength of the light used to measure the deflection of the cantilevers.

As in claim 11, the reference discusses placing a test liquid in the device; as in claims 12 and 13 the liquid can contain a biological molecule which binds to an antibody on the surface of the cantilevers (see paragraph [0009]).

The reference discloses that the beams from the VCSEL array be imaged onto the cantilevers (paragraph [0140]), although it does not describe doing this imaging by means of an array of microlenses as in claims 20, 36 and 49. The functional requirement is that the light be focused onto the cantilevers, not on the particular means doing the focusing. The use of known lenses for such focusing, such as the claimed lens array, would have been obvious because the one-to-one correspondence of the lenses would clearly match the one-to-one correspondence of the lasers and cantilevers.

Claims 21, 22, 50 and 51 call for particular numbers of VCSELs in the illumination array. The reference clearly discloses a plurality of VCSELs in the array (1708; see paragraph [0140]). Although the reference mentions the use of 8 (paragraph [0141]), it does not appear to teach that this specific number is the only possible number, or that larger numbers will not work, or should not be used. The reference does not appear to disclose having specifically sized output apertures as in claim 43. Those in the art could, using only ordinary skill, choose appropriate arrays of VCSELs to complete the disclosure.

As in claim 23, the VCSELs, to be operable, will have electrical connections; using known manners of establishing the electrical connections, as in claims 34, 35, 38, 40, 41, 42. The use of known substrates to mount the VCSELs, as in claim 37, and known manners of mounting them, as in claims 39, would have been obvious. The specification does not present these construction details as being applicant's invention per se but rather as no more than known expedients.

The reference, in paragraph [0140], at least clearly suggests that the number of VCSELs and the number of microcantilevers be “about the same” as in claim 32,

As for claim 47, as shown in figure 2 of the reference, the system of the reference has “a windowed lid” (13).

The cantilever sensors of the reference are small (with a spacing of about 250  $\mu\text{m}$ ; see paragraph [0140]). This requires a high degree of accuracy in the alignment between the lasers and the cantilevers. It would have been obvious to provide means to achieve and maintain this needed alignment, such as the micropositioner of claims 45, 46 and 48.

4. It appears that what may be intended by claims 9, 18, and 33, which claims the presence of a beam splitter, if adequately claimed, would be allowable if adequately claimed. The art does not appear to teach or suggest the use of an array of VCSELs illuminating an array of cantilever detectors through a beam splitter, which beam splitter then receives the light reflected from the cantilever detectors and directs it to photosensing means that detect the deflection of the cantilever detectors. See however, the rejection under 35 USC 112 above for these claims.

5. The previously applied Webb et al reference teaches the use of a beam splitter to direct a plurality of light beams from a microlaser array to an object and to a detector. As argued in the remarks filed 31 May 2006, the system of Webb et al does not direct the



light beams to a plurality of detectors and reflected light from the detectors to photosensing means, and in general is directed to a significantly different arrangement.

The remarks filed 31 May 2006 as directed to the Prater reference appear not to be directed to subject matter of the scope of the instant claims. As set forth above, the use of the term “microfluidics device” does not appear to be supported by structure in the claims of disclosure in the application as filed to distinguish over the system of the Prater et al reference, and, as also set forth above, to the degree that the term may be argued to have meaning which may distinguish over the system, it would have been obvious to use the detection system of Prater reference with differently designed flow cell which may be termed “a microfluidics device”, as the functioning of the detection system does not depend upon the dimensions of the flow cell containing the cantilever detectors.

The remarks filed 31 May 2006 point out that Prater arranges the light source to illuminate at a specific angle. This has no relevance to the claimed subject matter (with the possible exception of what may have been intended to be claimed with the as-claimed functionless beam splitter of claims 9, 18 and 33), which says nothing relating to the angle at which the light is directed to and reflected from the cantilevers. Similarly, the use of “complex mathematics” (remarks, page 11, lines 3-5) is not relevant because the instant claims say nothing about the manner of the interpretation of the signals from the detectors after the light is reflected.

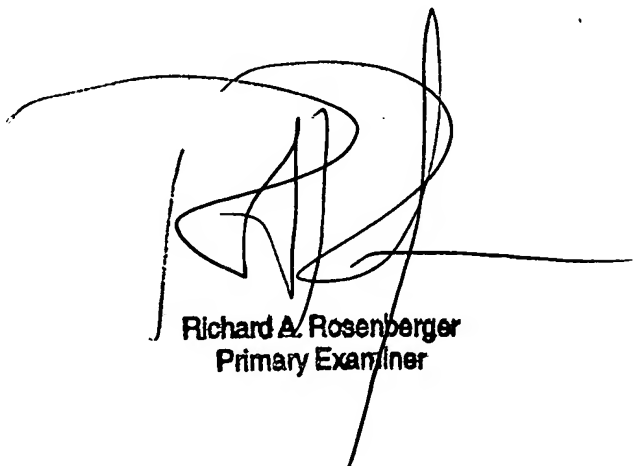
6. The Ishihara reference (US 5,737,084) shows the use of a beams splitter to direct a plurality of light beams to an object and light from the object to a detector array, with an array of microlenses (17). It does not direct light to a plurality of cantilevers to detect the deflection of the cantilevers.

Khoury et al (US 5,298,975) shows the use of a beam splitter arrangement to detect the movement of a single cantilever. It does not teach the parallel detection of a plurality of cantilevers.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A Rosenberger whose telephone number is (571) 272-2428. The examiner can normally be reached on Monday through Friday during the hours of 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R. A. Rosenberger  
10 August 2006



Richard A. Rosenberger  
Primary Examiner